

Role of Fine Needle Aspiration Cytology in the Evaluation of Cysticercosis - Subcutaneous and Intramuscular

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Abstract

Objective: To study the role of FNAC in the diagnosis of cysticercosis. **Materials and Methods:** Thirty patients with subcutaneous and intramuscular nodules having a differential diagnosis of tuberculous lymphadenopathy, reactive lymphadenitis, lipoma, neurofibroma and cysticercosis were included in the present study. **Results:** FNAC proved to be the definitive diagnosis in 13 cases where fragments of parasite bladder wall were seen. Histopathology confirmed the diagnosis. In the rest 17 cases, no fragments were observed in the FNAC smears and parasitic inflammation was suggested on the basis of other cytomorphological findings. Follow-up biopsy confirmed the diagnosis of cysticercosis. **Conclusions:** FNAC in cysticercosis is an easy , reliable ,cost effective non invasive outpatient procedure . The cytological diagnosis is conclusive in the cases where fragments of actual parasite are identified in the smears. However, in other cases, presence of a typical granular dirty background, eosinophils or/and histiocytes ,giant cells etc. Give an insight to the pathologist to consider this possibility. Definitive evidence on cytology obviates the need for histopathology.

Keywords: Cysticercosis; Fine needle aspiration cytology; Parasite.

Introduction

Cysticercosis is a potentially fatal parasitic disease relatively common in developing countries of Central and South America, Asia, and Africa, especially in those areas where humans and animals live in close contact, and in those regions where inspection of meat is not strict. In humans, cysticerci are most commonly located within the central nervous system (CNS), where they produce a pleomorphic clinical disorder known as neurocysticercosis. It may also primarily be located in a variety of tissues, including muscle,

heart, eyes, and skin.[1]

Man occasionally serving as the larval host of *Taenia solium* becomes infected either by drinking contaminated water or by eating uncooked vegetables infected with eggs.[2] The preoperative diagnosis of cysticercosis can be made by computed tomography (CT) scan and magnetic resonance imaging (MRI) and serological tests like complement fixation test, hemagglutination, radioimmunoassay and enzyme linked immunosorbent assay (ELISA).

Fine needle aspiration cytology (FNAC) is now available as a preoperative tool for the diagnosis of subcutaneous cysticercosis. The diagnosis is confirmed by the histopathological examination of the excised specimen.

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Materials and Methods

This study included 30 patients presenting with palpable subcutaneous and intramuscular nodules at different sites. FNAC was performed with 22-gauge needle and 20 ml BD syringe and smears made on glass slides.

May-Grünwald-Giemsa staining was done after air drying and fixing with methanol.

Subsequent excision biopsy was also evaluated.

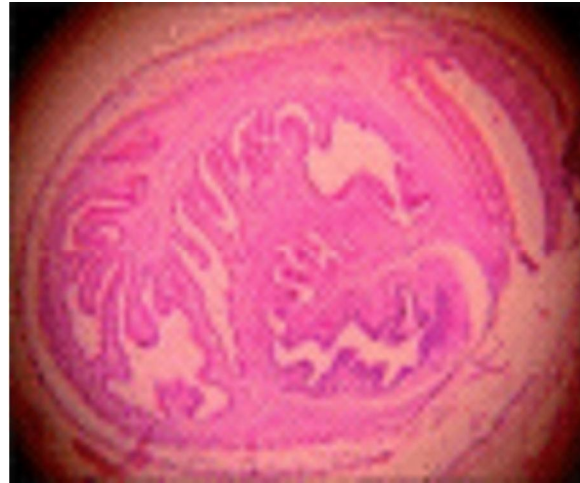
Results

The present study included 30 patients in the age group 2–65 years coming to the Cytology Department of Santosh Medical College, Ghaziabad. There was no obvious sex predilection in the present study wherein 13 subjects were females and 17 were males.

25 cases had solitary nodule while 5 cases presented with multiple nodules.

9 cases presented with neck nodules, 7 with abdominal lumps, 7 with nodules on extremities, 2 with swelling axilla, 2 with preauricular nodules, 2 with nodules on the

Figure 2: Cysticercus larva enclosed in a thin fibrous cyst wall (H&Ex40X)



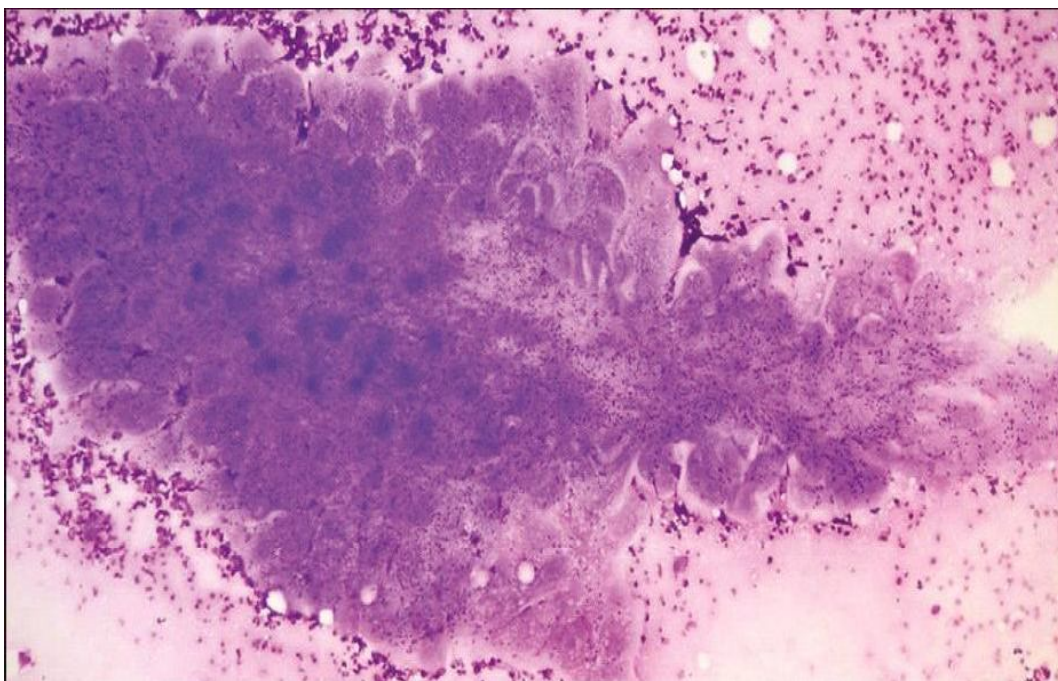
back and one with forehead nodule.

All the patients presented with painless slow growing nodule, soft to firm in consistency, and the provisional diagnoses were reactive lymphadenopathy, lipoma, neurofibroma, sebaceous cyst, tubercular lymphadenopathy and cysticercosis depending on the site.

In 27 cases, the aspirated material comprised of clear to dirty fluid while 3 cases yielded purulent fluid.

In 13 cases, on FNAC, smears showed

Figure 1: Cysticercus tegument and parenchyma (MGG×40X)



parasite wall, fragments and/or hooklets although the cytomorphology was not exactly the same in all cases. Follow-up biopsy confirmed the diagnosis. In the rest 17 cases, the cytological findings were very much suggestive of a parasitic cyst but no parasite could be seen. The smears showed a mixed inflammatory infiltrate comprising neutrophils, lymphocytes, eosinophils, histiocytes and giant cells (in varying proportions in different cases). In 3 of these 17 cases, well-formed epithelioid cell granulomas were also evident but no acid fast bacilli were seen on Ziehl Neelson staining. A cytological diagnosis of parasitic cyst was suggested and excision was advised. Follow-up biopsy confirmed the diagnosis of cysticercosis.

Discussion

Man is the definitive host for *Taenia solium* or tapeworm, a parasite found in the small intestine. Eating of undercooked and contaminated pork by man results in the larvae reaching the small intestine, where they develop into the adult stage of *Taenia solium*. The terminal segment of the parasite (proglottids) contains eggs and these are excreted in the feces. The feces, dispersed on the surface of the ground may be ingested by pigs, the intermediate host. The gastrointestinal secretions of the pig dissolve the eggs and liberate the embryos or oncospheres. These embryos then penetrate the intestinal mucosa and gain access to either the vascular or lymphatic circulation and are thus distributed to various tissues or organs, particularly skeletal muscles, subcutaneous tissue, eyes and the central nervous system. Here they develop into *cysticercus cellulosa*, the larval form of this parasite.[1,3]

Eating of undercooked and contaminated pork by man results in the larvae reaching the small intestine, where they develop into the adult stage of *Taenia solium*.

Parasitic fragments may comprise bluish, fibrillary structures, sometimes with honeycombing, calcospherules, tegument thrown into rounded wavy folds, scolex with

hooklets, and hyaline membrane surrounding it.[4]

Fully developed cysticerci are opalescent, milky white cysts, elongated to oval and about 1 cm in diameter. The cyst contains fluid and a single invaginated scolex. The scolex has a rostellum, four suckers and 22-32 small hooklets. The cyst wall is multilayered, 100-200 mm thick and covered by microvilli. The outer, cuticular layer appears smooth and hyalinized and is frequently raised in projections. Beneath the tegument is a row of tegumental cells. The inner layer or parenchyma is loose and reticular, containing mesenchymal cells and calcareous corpuscles.[5] The calcareous corpuscles are a unique feature of cestode tissue. These spherical, noncellular masses occur in the parenchyma and are especially prominent in larval cestodes. The corpuscles take on a bluish purple color in hematoxylin and eosin (H and E).[6]

Cysticerci nodules in the skin are difficult to differentiate from benign mesenchymal tumors and lymphadenitis on clinical grounds alone.[7] The cytomorphological identification of larvae in FNAC smears by different workers has widened the diagnostic utility of FNAC in skin nodules.[2,7,8] Suspicion about a parasitic lesion starts with the presence of eosinophils, neutrophils, palisading histiocytes and giant cells in an aspirate from subcutaneous nodule. A careful search for parasitic fragments should be carried out in the presence of polymorphous inflammatory infiltrate composed predominantly of eosinophils and histiocytes.[4]

The diagnosis of *cysticercus* is made when fragments of larval cuticle and parenchyma are identified.

Viable cysticerci may not cause any inflammatory response. However, when they degenerate, there is an infiltration of inflammatory cells, associated with the development of foreign body granulomas. The viable cyst and the necrotic and calcified lesions all have distinctive cytomorphological patterns. The viable cyst yields clear fluid and shows fragments of bladder wall in a clear acellular background. Aspirates of necrotic lesions may contain fragments of bladder wall, including

calcareous corpuscles and detached single hooklets.[9]

FNAC in cysticercosis is a low-cost outpatient procedure. It is one of the tools for preoperative diagnosis and may even obviate the need for open biopsy.

The cytological diagnosis is conclusive in cases where actual parasite structure is identified in the smears. However, in other cases, the presence of a typical dirty background, eosinophils, histiocytes single or in pallisaded clusters or a foreign body granuloma, etc. are the features which should always alert the pathologist to this possibility.

Nonetheless, in still some cases of cysticercosis, none of these features may be present, and the inflammatory infiltrate may also be variable. Cysticercosis is more common than usually thought.

In all inflammatory/cystic/inflammatory cystic lesions, the possibility of cysticercosis should be kept in mind.

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